DEPARTMENT OF THE ARMY ETL 1110-1-161
U.S. Army Corps of Engineers
CEMP-RT Washington, D.C. 20314-1000

Technical Letter
No. 1110-1-161 29 March 1996

Engineering and Design
ULTRAVIOLET/CHEMICAL OXIDATION

1. Purpose. This engineering technical letter (ETL) was written to provide guidance for designers to determine appropriate applications for the Advanced Oxidation Process (AOP) utilizing Ultraviolet/Chemical Oxidation (UV) to destroy organic contaminants in Aqueous Media and then to properly design and specify UV/Oxidation systems.

2. Applicability. This ETL applies to all HQUSACE elements and USACE Commands having military or civil works engineering design responsibility. The engineering and design procedures are applicable to projects on Hazardous and Toxic Wastes Sites, Department of Defense (DoD) Sites, or for other Federal Agencies for which the U.S. Army Corps of Engineers is the responsible design agent.

3. References.

a. ER 1110-345-100, Design Policy for Military Construction,

b. ER 1110-345-700, Engineering and Design, Design Analysis,

c. ER 1110-345-710, Drawings,

d. ER 1110-345-720, Construction Specifications,

e. ER 1110-2 1150, Engineering and Design for Civil Work Projects,

f. For other specific references see Appendix D.

4. Discussions. The attached appendices present the procedures and considerations associated with the engineering and design of the Advanced Oxidation System utilizing UV/Chemical Oxidation Process, including:

a. Appendix A - Design Considerations. The information presented in this appendix provides a comprehensive overview of design and engineering considerations for UV/Oxidation:

(1) Background information, theory, and definitions;

(2) Principles of operations for different mode of operations;

(3) A summary of UV/Oxidation applicability, a comparison with other Advanced and Conventional oxidation options, and typical operating performance;

(4) An overview of design considerations from wastewater equalization through disposal, and specific design considerations for components of the UV/Chemical Oxidation equipment and associated accessories and auxiliary systems;

(5) A summary of legal requirements and permits for typical sites;

(6) Wastewater characterization and Treatability studies;

(7) Equipment sizing criteria and considerations;

(8) Construction materials and installation considerations;

(9) Operation and Maintenance considerations; and

(10) Design and construction package requirements.

b. Appendix B - Design Calculations. This appendix presents the types of calculations and documentation required in the design of UV/Oxidation applications.

c. Appendix C - Checklist for Design Documents. This appendix presents a checklist of design documents for UV/Oxidation systems including the design analysis, plans, guide specifications, and operation and maintenance manuals.

d. Appendix D - Bibliography. This appendix presents references and sources of information for the design considerations presented throughout the ETL.

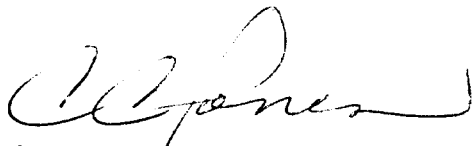
e. Appendix E - Design Examples. This appendix presents a summary of the design approach for UV/Oxidation applications and three illustrative design examples.

f. Appendix F- List of Abbreviations and Definitions. This appendix provides acronyms and definitions of terms used throughout the ETL.

5. Actions To Be Taken. Each U.S. Corps of Engineers design element will be responsible for incorporating guidance into HTW or military construction designs. This ETL will be considered as the design guidance for UV/Oxidation installations.

6. Implementation. This information will be used by USACE personnel responsible for the design and review of the HTW projects utilizing the (UV) technology. This information will be incorporated into HTW projects which have not completed the 90 percent stage of design. This ETL will have routine application to military construction projects as identified in paragraph 3. a, ER 1110-345-100.

FOR THE DIRECTOR OF MILITARY PROGRAMS:



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Appendix A - Design Considerations
Appendix B - Design Calculations
Appendix C - Checklist for Design Documents
Appendix D - Bibliography
Appendix E - Design Examples
Appendix F - List of Abbreviations